indicated by alternate long and short dash lines represents the front view of the outer appearance, and a portion to the left of the axis O represents a cross-sectional view of the cross-section that passes through the axis O. In the following description, the lower side in FIG. **1** is referred to as one end side of the spark plug **100** and the upper side in FIG. **1** is referred to as the other end side of the spark plug **100**.

[0019] The spark plug **100** includes an insulator **10**, a center electrode **20**, a ground electrode **30**, and a tubular metal shell **50**. At least a part of the outer circumference of the insulator **10** is held by the metal shell **50**, and has an axial hole **12**. The center electrode **20** is provided in the axial hole **12**. The ground electrode **30** has a base end portion **32** fixed to the metal shell **50**. Hereinafter, these components will be described in detail.

[0020] The insulator **10** is a ceramic insulator formed by a ceramic material such as alumina being sintered. The insulator **10** is a tubular member which accommodates a part of the center electrode **20** on one end side, accommodates a part of a metal terminal **40** on the other end side, and has the axial hole **12** formed at the center thereof. The insulator **10** has, at the center thereof in the axial direction, a central trunk portion **19** having a large outer diameter. On the other end side of the central trunk portion **19**, the other end side trunk portion **18** having an outer diameter less than the central trunk portion **19** is formed. The other end side trunk portion **18** insulates the metal terminal **40** and the metal shell **50** from each other. On one end side of the central trunk portion **19**, one end side trunk portion **17** having an outer diameter less than the other end side trunk portion **18** is formed. Further, on one end side of one end side trunk portion **17**, a leg portion **13** having an outer diameter that is less than one end side trunk portion **17** and that is reduced toward the center electrode **20**, is formed.

[0021] The metal shell **50** is a cylindrical metal shell that surrounds and holds a portion, of the insulator **10**, extending from a part of the other end side trunk portion **18** to the leg portion **13**. The metal shell **50** is formed of, for example, low-carbon steel, and is entirely plated with nickel, zinc, or the like. The metal shell **50** includes a tool engagement portion **51**, a seal portion **54**, and a mounting screw portion **52** in order, respectively, from the other end side. To the tool engagement portion **51**, a tool for mounting the spark plug **100** to an engine head is fitted. The mounting screw portion **52** has thread ridges which are screwed into a mounting screw hole of the engine head. The seal portion **54** is formed so as to be flange-shaped at the root of the mounting screw portion **52**. An annular gasket **65** formed by a plate body being bent is inserted between the seal portion **54** and the engine head. An end surface **57**, on one end side, of the metal shell **50** is formed into a hollow circular shape, and one end of the leg portion **13** of the insulator **10** and one end of the center electrode **20** project at the center of the end surface **57**.

[0022] A crimp portion **53** having a reduced thickness is formed in a portion, of the metal shell **50**, which is closer to the other end side than the tool engagement portion **51** is. Further, a compressive deformation portion **58** having a reduced thickness as in the crimp portion **53** is formed between the seal portion **54** and the tool engagement portion **51**. Annular ring members **66** and **67** are disposed between the inner circumferential surface, of the metal shell **50**, which extends from the tool engagement portion **51** to the crimp portion **53**, and the outer circumferential surface of the other end side trunk portion **18** of the insulator **10**. Further, powder of a talc **69** is filled between both the ring members **66** and **67**. When the spark plug **100** is produced, the crimp portion **53** is bent inward and pressed toward one end side, whereby the compressive deformation portion **58** is compressively deformed. By the compressive deformation portion **58** being compressively deformed, the insulator **10** is pressed toward one end side in the metal shell **50** through the ring members **66** and **67** and the talc **69**. By the insulator **10** being pressed, the talc **69** is compressed in the direction of the axis O, and airtightness is enhanced in the metal shell **50**.

[0023] In the inner circumference of the metal shell **50**, a ceramic step portion **15** positioned on the other end of the leg portion **13** of the insulator **10** is pressed, through an annular sheet packing **68**, against a metal shell step portion **56** formed on the inner circumference of the mounting screw portion **52**. The sheet packing **68** is a member for maintaining airtightness between the metal shell **50** and the insulator **10**, and prevents outflow of combustion gas.

[0024] The center electrode **20** is a bar-like member in which a core material **22** having a thermal conductivity which is more excellent than an electrode base material **21** is embedded in the electrode base material **21**. The electrode base material **21** is formed of a nickel alloy containing nickel as a main component. The core material **22** is formed of copper or an alloy containing copper as a main component. To one end side of the center electrode **20**, for example, a noble metal tip formed of an iridium alloy or the like, may be joined.

[0025] Near the other end portion of the center electrode **20**, a flange portion **23** that protrudes on the outer circumference side is formed. The flange portion **23** contacts with an axial hole step portion **14** formed in the axial hole **12**, from the other end side, to position the center electrode **20** in the insulator **10**. The other end portion of the center electrode **20** is electrically connected to the metal terminal **40** via a seal body **64** and a ceramic resistor **63**.

[0026] FIG. **2** is an enlarged view of a portion near the ground electrode **30**. The ground electrode **30** is formed of an alloy containing nickel as a main component. The ground electrode **30** has the base end portion **32** fixed to the metal shell **50**. Further, the ground electrode **30** is formed such that one side surface **34** of a front end portion **33** of the ground electrode **30** opposes an end surface **24**, on one end side, of the center electrode **20** through a gap G. When power is supplied to the spark plug **100**, spark discharge is caused mainly in the gap G. The gap G is, for example, 0.5 to 1.5 mm in size, and is 1.1 mm in size in the present embodiment. An intermediate portion **35** between the base end portion **32** and the front end portion **33** of the ground electrode **30** is bent.

[0027] On one side surface **34** side of the ground electrode **30**, a noble metal tip **31** having a front end **37** that projects forward of the front end portion **33** of the ground electrode **30**, is formed. "Forward of the front end portion **33** of the ground electrode **30**" means "forward of the front end portion **33** of the ground electrode **30** in a direction in which an end surface **36** of the front end portion **33** of the ground electrode **30** faces (the right side on the surface of sheet in FIG. **2**). In the present embodiment, the front end **37** of the noble metal tip **31** projects forward of the front end portion **33** of the ground electrode **30**. Therefore, spark can be inhibited from being discharged to the end surface **36** of the